UTILITY APPLICATION

OF

GARRETT BURKE

FOR

UNITED STATES PATENT

ON

READING AID FOR ELECTRONIC TEXT AND DISPLAYS

Docket Number: 01-9051

Sheets of Drawings: EIGHT (8)

Sheets of Written Description: THIRTY-THREE (33)

Express Mail Label Number: EL 818 716 892 US

Attorneys
CISLO & THOMAS LLP
233 Wilshire Boulevard, Suite 900
Santa Monica, California 90401-1211
Tel: (310) 451-0647
Fax: (310) 394-4477
Customer No.: 25,189
www.cislo.com

READING AID FOR ELECTRONIC TEXT AND DISPLAYS

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to computer displays and the like and more particularly to a reading aid that directs the viewer's attention to specific areas on the computer display.

Description of the Related Art

Figure 1 shows a computer display, keyboard, and mouse well-known in the current art. The computer 10 generally has a CPU (central processing unit, not shown) which serves as the processing device for electronic signals, including electronic text, graphics, audio, etc. With the advances in digital information processing, any signal that can be digitized and converted into an electronic form is generally one that can be handled by a computer, including a personal computer as known in the current art. While the extent of digital signal processing and information handling has yet to be fully explored, many advantages are currently known, including the copying and transfer, as well as creation and editing, of computer text files through word processors or the like.

While word processing programs and the like make the creation and editing of text simple and easy, the reading by a person of such text through electronic means is one that is not as simple and easy. A computer display can present several different display areas for a

2

viewer's examination, and each area may have equal validity or presence so that one area that might be of particular interest is not distinguished over any other. Under such circumstances, the text of such displays would be undifferentiated without the ability to readily distinguish between one area of text or another.

Scrolling of text is well-known in the art, where the area of display for specific text only shows a portion of the entire document. In order to see other portions of the document, a scroll bar 18 or the like is used to scroll the text under the present window vertically or horizontally, depending upon the selected scroll bar. This is a well-known standard in the Windows and Macintosh operating systems as well as other established graphic user interfaces (GUIs). While an open window enabling the viewing of a document provides some indication as to text of interest, the window does nothing to indicate specific portions of the text displayed.

With the continuing development of memory and processing technologies, resolution of computer display screens is increasing. This allows more legible text to be displayed by a single screen, making it harder to track specific text on a screen or window and making it more difficult for a person to turn away from, or leave, a particular display and return to the area of interest just prior to the person's departure. For example, if one is reviewing, reading, or editing text and then departs for lunch or the like, upon returning to the display, no indication can be given as to where the individual ended the session. While removable sticky notes or the like might be used, as well as scrolling to the last point of review, these options generally impose burdens upon the viewer that are not necessarily welcome, remembered, or consistently useful.

3

As electronic text becomes more of a rule than an exception, the accommodation of readers of such electronic text takes increasing precedence in order to convey the information and understanding conveyed by the text. This may be especially true for younger computer display users who are more easily distracted and would be aided by a device or system that focused the attention upon text being read.

Computer displays now take all forms and sorts including hand-held computer devices and portable digital assistance (PDAs) which may have different problems due to the "look down" style of use, the increased use of such devices, the demands of making such devices convenient, or otherwise.

Attempts have been made in the prior art to alter or enhance computer displays by a variety of schemes and methods. Some of the more pertinent are set forth below.

Gross et al., U.S. Patent No. 6,044,385, refers to a method and system for efficiently managing the manipulation of large documents displayed within a computer screen. Referring to the Figures, a sample document 132 is placed in its entirety into the application's user window 105 regardless of the resulting legibility of said document. This patent discloses the use of a lens bar 130 which is used to delimit a region of said document 134 in which the contents of the document are rendered in a "normal", legible manner. A user can utilize scroll bar 116 to scroll lens portion 134 of lens bar 130 through sample document 132.

Robertson et al., U.S. Patent No. 5,670,984, is directed to an image lens for displaying an image on a display surface which preserves context and detail information when the image is compressed to fit onto a display surface. As illustrated in the drawings, a 3-D perspective view of a truncated pyramid 203 onto which a full image 200 is mapped. For the 3-D

4

transformation, image 200 is divided into five subimages which are mapped onto the five

visible faces of truncated pyramid 203. Viewing plane 214 defines what is visible from

viewpoint V, and determines the eventual image to be displayed on the computer display

surface 104.

The parameters of the transformations performed on a full image are derived from a

description of viewpoint V, the boundaries of full image 200, the boundaries of image lens

212, and the relative distances between full image 200 at the base of truncated pyramid 203,

image lens 212, view plane 214, and view point V. These parameters can be adjusted by a

user to have the visual effects of moving the image lens in and out (zoom) and moving the

image lens over full image 200 (pan). Furthermore, in an interactive embodiment, a user

manipulates an input device, such as a mouse or a keyboard, to move the image lens over the

global image. The portion of the document visible within the boundaries of the lens panel is

rendered legibly, whereas the portion of the document outside the region defined by the lens

panel is rendered as a 2-D projection of a 3-D trapezoid.

Winsky et al., U.S. Patent No. 5,774,109, discloses an electronic scrolling book with

temporary interruptions. Referring to the diagrams, an electronic book machine 10 includes a

platform 12 which can be held by hand and which carries a keyboard 14 and a display screen

16. The platform is provided with a slot receiving a card 18 which carries a data base 20.

Platform 12 carries a microprocessor 30 which implements an electronic scrolling function.

More specifically, microprocessor 30 accesses memory portion 22 of data base 20 to determine

text for display on screen 16 at a given scroll rate. The operator of the book machine 10 may

modify the scroll rate via keyboard 14. Between a preset minimum and a preset maximum, the

scroll rate may be changed in increments or steps in accordance with the number of actuations of the up or down directional key 34 or 36.

Microprocessor 30 further includes a pause marker detection module 46 which co-functions with scroll control 40 to temporarily and automatically halt the scrolling of text on display screen 16 in response to markers contained in the text. The duration of the pause and the display process varies in accordance with the kind of marker. Examples of pause markers include punctuation such as commas and periods and other normally-encountered reading pauses such as paragraph changes.

Huffman et al., U.S. Patent No. 5,663,748, is directed to an electronic book having highlighting feature. As referenced in the diagrams, a touch screen 130 is integrated in a book-shaped housing 100 to be accessible when said housing is opened in a book-like manner. The touch screen is in communication with a processor 152 to display a page of text and/or the graphics represented by the machine-readable data. Further, the touch screen 130 acts as an input device to receive user-initiated events, and communicates these events or actions to the processor 152.

Figure 14 is an illustration of the title page of a book wherein a pacing control option is selected by a user. The desired reading page is controlled by the user using a graphical slider bar 294. The pages of the text in the book are automatically paced by a pacing routine which is enabled or disabled by a graphical switch 296.

In Figure 19, a user is selecting a portion of a page of text 330 by a user-initiated event of sliding his finger 212 from a first portion 332 to a second portion 334. Upon his selection, the portion 330 of the text is highlighted in a predetermined manner. An option selection

dialog box 340 is displayed on the touch screen in a location out of the way of the portion 330 of the text that is marked when possible. The option selection dialog box includes a plurality of text marking options including a note-capture option 342, a highlighting option 344, a quote-capture option 346, and a set bookmark option.

5   Arend et al., U.S. Patent No. 6,012,073, discloses a method and system for displaying original documents and translations thereof. As observed in the illustrations, a computer display screen 14 includes an overview screen 20 in which reduced size images 22 of a large document are rendered. When a user clicks the computer's mouse button on the page 30, the portion of that page of the document surrounding the area where the user has clicked will be

10   displayed in the main display 12 as shown in Figure 7.

When a user selects the translation window button 56, a translation window 16 appears over the main body 12 in the manner shown in Figure 9. The borders of the translation window are each linked to the computer system's pointing device such that the user can "drag" the display window up and down with respect to the main display 12 in a conventional manner.

15   Dragging the mouse cursor within the main display 12 causes the overall image to be scrolled up and down or left to right within the main display. When the display window 16 is open, the translated content is scrolled along with the main display content.

There remains a more direct solution to the problem of directing the user's attention to specific portions of a computer display and related shortcomings. It would be an advance in

20   the art to provide means by which the certain text being read could be discriminated or highlighted during display, in order to provide better and more useful reading sessions of such electronic text. The present invention provides a solution to problems and shortcomings in the

art, while providing the user enhanced utility in conjunction with adjustable parameters and other features delivering more convenience.

SUMMARY OF THE INVENTION

In order to provide a computer screen highlighter, the present invention uses an overlay generator that interacts with the computer's video memory, so that certain selected portions of the display are held in a generally normal, clear, and legible manner, while other portions of the display are made more opaque. By delivering such a contrast, the text or display area of interest is highlighted so as to direct the user's attention to it. The overlay generator takes information regarding the screen display, such as the location of windows and the size of the display, and biases those portions of the window that should be made more opaque. The degree of opacity can be adjusted, as can the disposition and attitude of the clear or highlighted portion of the screen.

The overlay generator provides the biasing necessary to establish the frame on the computer screen as a whole or for separate windows in a graphics user interface (GUI). The parameters of the framing system may be subject to user adjustment by a variety of controls. A bookmarking submenu may be made available so that documents may be brought into a framed window according to user preferences. The overlay generator may be disposed with respect to the video memory or video data stream by a number of alternative embodiments.

Upon biasing by the overlay generator, the video display signal is then transmitted to the screen where the biasing is shown by the contrasting opacities of the clear focus area and the more opaque collateral areas.

In preferred embodiments, user adjustments include width, percentage opacity, position, and color adjustments. Additionally, a bookmarking function that allows the establishment of document and document part or location can be facilitated through the present invention.

5

OBJECTS OF THE INVENTION

It is an object of the present invention to provide easier reading of computer displays.

It is yet another object of the present invention to provide easier reading of computer displays by delivering a highlighted or contrast portion of a computer display that is readily

10 more readable than collateral areas.

It is yet another object of the present invention to provide easier reading of computer displays in an adjustable manner.

It is yet another object of the present invention to provide easier reading of electronic text that focuses the reading or attention on the document portion of current interest.

15 It is yet another object of the present invention to provide emphasis to document portions in an easy and convenient manner.

These and other objects and advantages of the present invention will be apparent from a review of the following specification and accompanying drawings.

20 # BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a diagrammatic view of a computer interface system commonly used by computer users including a computer display, keyboard, and mouse.

Figure 2 is an enhanced view of a computer screen prior to the invocation of the present invention.

Figure 3 shows the contrasting screen portions upon invocation of the present invention as well as the control bar adjustment controls.

Figure 4 shows an alternative display presentation as determined by the adjustment controls.

Figure 5 is a diagrammatic view of the bookmarking feature of a computer display implementing the bookmarking feature of the present invention.

Figures 6-8 show alternative embodiments of logical architectural configurations, showing the relative disposition of the overlay generator with respect to the video memory and other components of the video signal transmission and display subsystem of a computer.

DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

The detailed description set forth below in connection with the appended drawings is intended as a description of presently-preferred embodiments of the invention and is not intended to represent the only forms in which the present invention may be constructed and/or utilized. The description sets forth the functions and the sequence of steps for constructing and operating the invention in connection with the illustrated embodiments. However, it is to be understood that the same or equivalent functions and sequences may be accomplished by different embodiments that are also intended to be encompassed within the spirit and scope of the invention.

As shown in Figure 1, the computer interface system **10** may have a computer display **12**, as well as a keyboard **14** and mouse **16**. The computer display **12** displays images

10

generated or transmitted by the computer, while the keyboard **14** and mouse **16** send signals to the computer for processing and possible display on the computer display **12**.

Figure 2 shows the computer screen **20** of the computer display **12** in an enlarged view, showing a web page **22** having a significant amount of text **24**. Indicated in the lower left-hand part of the computer screen **20** is an activate/deactivate toggle button **30** that serves as an invocation toggle for the Reading Aid for Electronic Text of the present invention. The activation toggle button **30** may be activated by clicking upon it as by the cursor **32** which is controlled by the mouse **16**. The mouse **16** can be used to click on the activation toggle button **30** in order to invoke an instance of the present invention on the computer screen **20**.

Figure 3 shows one embodiment of the present invention when the activation toggle button **30** has been activated. Shown in Figure 3 is the computer screen **20** with an opaque portion **40** divided by a clear portion **42**. Additionally, a control bar **46** with separate adjustment controls **50, 52, 54, 56** may be controlled by the cursor **32**. The control bar **46** may be extracted or replaced from the activation toggle button **30** by the cursor **32**. The cursor **32** may engage the small extending tab **60**. By double-clicking on the tab **60**, the control bar **46** may extend to its full position. If extended, double-clicking the tab **60** may withdraw or return the control bar **46** to the activation toggle button **30**. Additionally, clicking and dragging the tab **60** may serve to extend or retract the control bar **46** according to movement of the cursor.

Upon invoking the activation toggle button **30** as by double-clicking upon it, a default frame **40** may be superimposed or installed upon the computer screen **20**. As described in more detail below, the presence and features of the frame **40** may be achieved through

interaction of the video signal via or in conjunction with the video memory or other repository

video signals prior to their display. The frame **40** may be as shown in Figure 3 with a series

of diagonal lines serving to frame the framed area **42**. By comparing Figures 3 and 4, it can

be seen that the framed area **42** may be narrow or wide and the frame **40** dense or light. These

characteristics may be controlled by the adjustments **50 – 56** of the control bar **46**.

It is to be understood that the indications given in Figures 3 and 4 are exemplary only.

For example, instead of using diagonal lines shown in Figures 3 and 4, a variety of other

means or characteristics might be used in order to provide the frame **40**. One example of this

is to alter the color of the frame **40** as by biasing the video signal. As is well-known in the art,

the video signal is represented numerically, and the data is interpreted in context as being that

of a video signal. In order to provide the video signal, data is given with respect to each pixel

on the computer screen **20**. Depending upon the variety and spectrum of colors available, a

pixel may be represented by 2, 8, 16, or 24 bits. By biasing the pixel's value, a frame **40** can

be generated that is easily distinguished from the framed area **42** yet maintains the visibility or

legibility of the original video signal subject to the frame **40**.

An example of this is most dramatically seen on color displays. For displays using only

1 bit, only 2 degrees of freedom are present: on and off. This generally limits the framing

capacity to either light or dark. However, with 8, 16, and/or 24 bit or other systems, a bias of

approximately 10% would serve to visibly alter the display without making illegible the

underlying original video signal. In an 8-bit system, there are 256 possible values for a pixel.

This gives a 10% value of approximately 25, and the number 25 can be added or subtracted

from the value of a pixel in order to bias the frame portion **40** to provide contrast with the

framed portion **42** of the display **20**. Similarly, if video signals contain pixel information with respect to luminosity, luminosity could be increased or diminished according to a predetermined or user-selectable bias. Additionally, if predictable spectrums are present within the range of values for pixel information, certain displacement or biasing could also occur that would maintain certain ones of characteristics of the framing pixels **40**, so that there were some similar characteristics between the framing **40** and framed **42** portions of the display **20**.

Note should be taken that while the entire computer screen **20** is shown as being either a framing portion **40** or a framed portion **42**, it is also within the contemplation of the present invention that the window itself **70** is the only portion of the computer screen **20** that is subject to the Electronic Reading Aid of the present invention. In this way, the framing provided by the Reading Aid may be subject to overlap by other windows or the like or subject to minimization, restoration, and/or maximization as per standard window usage in a graphic user interface (GUI). Consequently, one of several windows could be the subject of the Reading Aid of the present invention without there being such framing with respect to the other windows and/or computer screen or desktop.

With respect to the user-selectable controls **50 – 56** as associated with the control bar **46**, it can be seen in comparing the adjustments of Figures 3 and 4 that the changing of the adjustment serves to change the display characteristics of the Reading Aid of the present invention.

For example, in Figure 3, the width adjustment **50** is set for a wider framed area **42** in Figure 3 and a narrower framed area **42** in Figure 4. The opacity or percentage opacity **52** is

greater in Figure 4 than in Figure 3, and the position of the selection bar **74** for the percentage

opacity adjustment **52** is correspondingly positioned for less opacity in Figure 3 and greater

opacity in Figure 4. The position adjustment **54** is set at different positions for Figure 3 than

for Figure 4, and the center of the framed portion **42** is likewise generally offset in an

analogous manner between the two figures. The color adjustment **56** is shown at one location

for Figure 3 and a separate location for Figure 4. While Figures 3 and 4 are portrayed in

black and white, the use of color computer displays **12** allow for the adjustment of the color

such that the user may select a preferred or desired color through the color adjustment **56** and

adjust the opacity of that color by adjusting the percentage opacity adjustment **52**.

Other adjustments are also within the contemplation of the present invention, such that

luminosity or any other pixel characteristic could be subject to adjustment through the control

bar **46**. Additionally, the clear portion **42** could be controlled as by a software option to follow

the cursor **32** instead of the scroll bar **18**. In such an embodiment, the cursor **32** could allow

the clear, or transparent, portion **42** to move in the same arbitrary fashion as the cursor **32**,

immediately focusing the attention of a reader or other audience upon the text or displayed file

portion of interest. This application might well lend itself to online or in person instructional

sessions where a computer's display is projected or transmitted for an audience's inspection

and review.

Further, software control could also enable the swapping of the clear **42** and opaque **40**

portions of the screen. One interface device that could enable this transformation is a small

icon or other indicator in the control bar **46**. Upon clicking upon this icon, the opaque **40** and

clear **42** portions of the screen **20** would transpose with the opaque portion becoming clear and

the clear portion becoming opaque. The formerly clear portion **42** would then become opaque and surrounded on either side by opaque portions **40** that had become clear. The activate/deactivate toggle button **30** might provide a submenu to enable this feature.

One means by which the Reading Aid of the present invention may be associated with a single window is by clicking and dragging the activation button **30** to the window of interest. An icon, marker, or the like could then be associated with the display for that window, allowing the use of the control bar **46** for that window alone. For the control of several different windows, different instances of the Reading Aid of the present invention could be invoked, one for each window the user desires to make subject to the present invention.

Figure 5 shows a display similar to that of Figure 4 where a narrow framed portion **42** is surrounded by a larger framing portion **40**. In addition to the control bar extending tab **60**, a bookmark submenu **80** might be made activated by the cursor **32** by clicking on a specific designated portion of the activating toggle button **30**. The bookmark submenu **80** may contain a list of bookmarked sites **82** that are brought into the present window by clicking upon the site's indication on a list. For some sites **84**, text that has been highlighted **85** with respect to the site may be listed below the site's entry in the bookmark submenu **80**. Additionally, subfolders or submenus **86** may lead to additional listings **88** of bookmarks with indications of highlighted text. In the bookmark submenu **80**, an activation area for bookmarking sites **90** may be present that activates the process by which bookmarks are added to the bookmark submenu **80**. Additionally, an activation area for editing bookmarks **92** may also be present in order to edit the contents or data associations with a bookmark in the bookmark submenu **80**.

In order to bookmark a site, text may be highlighted within a page and/or the cursor positioned to a certain location in a document. The Add Bookmark process is then initiated by clicking upon the bookmark activation area **90**, and the document and location is then added to the database associated with the bookmark submenu **80**. If any text has been highlighted **96**, it may also be added to the database entry associated with the new bookmark.

As every document or resource on a computer network is generally defined uniquely with respect to the user's computer, Universal Resource Locators (URLs) can be generated for the bookmark submenu **80** in order to uniquely identify the document subject to bookmarking. In order to specifically return to a designated location inside a document, a search routine might be used in order to find the user's selected location, any highlighted text used to generate a relevant search string. Additionally, a character count or otherwise could be used, as well as a numeric indication of the extension of any highlighting present. Other means known in the art may also be used in order to define a location to which the user may care to return, such that he or she would care to bookmark that location in a document.

Figures 6 – 8 show basic logical configurations with respect to the overlay generator **100**. In Figure 6, the overlay generator **100** generates a bias that is then incorporated by the video memory prior to transmission of the computer display **12**. In Figure 7, the biasing occurs after the video memory transmits its video signal. In Figure 8, the overlay generator **100** operates in conjunction with the video memory in order to provide a biased framing signal to the computer display **12**.

The present invention may be realized in a number of different embodiments and may be used in conjunction with a number of different operating systems. Using portable computer

16

languages such as JAVA and C, the present invention may be coded and implemented on a variety of different microprocessors running a number of different operating systems. These include microprocessors by Motorola and Intel, as well as operating systems for use on PCs based upon Microsoft's Windows operating system or otherwise, the Macintosh operating system or other operating systems as marketed by Apple Computers, Linux, Unix, and others that are now known or later developed.

Also, while a horizontal embodiment for the English language has been shown herein, alternative embodiments within the contemplation of the present invention include the use of other languages and framed area geometries including vertical framing of Asian characters or ideograms for Asian-language texts.

The present invention provides excellent means by which electronic text can be presented for public viewing for an audience of several people. Additionally, the present invention may be used in conjunction with programmed reading exercises or other reading activities so that certain portions of a document are highlighted in contrast to others. In one embodiment, the framed portion may move over the text to force the reader to read at a certain rate or to promote continuous or speed-reading. In this way, the student's reading abilities may be exercised and developed by means of electronic image displays. Due to the possible ubiquity and convenience of such electronic displays, the Reading Aid of the present invention provides a significant advantage over other systems and delivers to the reader means by which text can be contrasted for leisure reading for enjoyment, technical reading for professional purposes or otherwise.

While the present invention has been described with regards to particular embodiments, it is recognized that additional variations of the present invention may be devised without departing from the inventive concept.